process for producing an expanded polyethylene blend of low density polyethylene (LDPE) and high density polyethylene (HDPE) by employing a chemical blowing agent and a certain low molecular weight polyolefin wax. By employing chemical blowing agents, Sakamoto is able to achieve an expansion ratio of no greater than 63.6% (see Examples 1-4). This calculates to a density of no less than 340 kg/m^3 (see attached density calculations by the inventors hereof).

The presently claimed foam has a much lower density, preferably ranging from 10 to 160 kg/m^3, as set forth in claims 7 and 15. Such lower density range is preferably achieved by employing a physical blowing agent, instead of a chemical blowing agent as disclosed in Sakamoto. Accordingly, independent claims 1 and 8 have been amended to specify the preferred density range of respective dependent claims 7 and 15, and to specify that a physical blowing agent is employed (support for the amendments is found in the specification at page 6, lines 12-14 and in the paragraph bridging pages 6 and 7). The claims are now novel over Sakamoto.

Claims 1-5 and 7-14 also stand rejected under 35 USC 103(a) as being unpatentable over Sakamoto (US 5,346,926).

Given Sakamoto's specificity with respect to employment of a chemical blowing agent, resulting in a relatively low degree of expansion, it is submitted that it would not have been obvious from the teaching of Sakamoto to use a physical blowing agent to obtain a foam comprising a blend of LDPE and high MI HDPE, which has a much lower density than that obtainable by Sakamoto. Such lower density foam would not be suitable in Sakamoto's process, in which polyethylene foam is used as insulation for small diameter electric wire. For such wire insulation, a higher density foam as taught by Sakamoto is required.

As now presented, therefore, the foam of claim 1 and method of claim 8 are submitted to be patentably non-obvious over Sakamoto.

Accordingly, Applicants submit that the claims as now presented are patentably distinct from the references of record and are, therefore, in condition for allowance. A Notice of Allowance is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In th claims:

Claims 1 and 8 have been amended to read as follows:

1. (Amended) A foam having a density ranging from about 10 to about 160 kg/m^3 and produced from a physical blowing agent, comprising a blend of a low density polyethylene and an ethylene polymer having a density ranging from greater than 0.94 to about 0.97 grams/cubic centimeter and a melt flow index of greater than 10 g/10 minutes, said ethylene polymer comprising at least one member selected from ethylene/alpha-olefin copolymer, ethylene homopolymer, and blends thereof.

8. (Amended) A method of making a foam, comprising:

a. blending a low density polyethylene and an ethylene polymer having a density ranging from greater than 0.94 to about 0.97 grams/cubic centimeter and a melt flow index of greater than 10 g/10 minutes, said ethylene polymer comprising at least one member selected from ethylene/alpha-olefin copolymer, ethylene homopolymer, and blends thereof;

b. adding a physical blowing agent to said blend; and

c. causing said blowing agent to expand within said blend, thereby forming a foam, whereby, said foam has a density ranging from about 10 to about 160 kg/m^3.

In addition, claims 7 and 15 have been canceled.

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Density calculations by S.T. Lee/N.S.Ramesh based on data disclosed in Sakomoto (US 5,346,926)

Example	Wt. % HDPE	Wt. % LDPE	HDPE density. g/cc	LDPE density, g/cc	Blend density, g/cc	% Expansion ratio	Foam Density, g/cc	Foam Density, kg/m^3
1	23.08	76.92	0.96	0.917	0.9269	63%	0.3429	343
2	50	50	0.95	0.934	0.934	63.6%	0.3399	340
3	50	50	0.959	0.9395	0.9395	63.5%	0.3429	343
4	16.67	83.33	0.96	0.925	0.925	61.7%	0.3542	354

Model Calculations for Example 1:

Blend density (column 6) = density of HDPE x wt. Fraction HDPE +
density of LDPE x Wt. Fraction of LDPE
= 0.96 x 0.2308*+ 0.917 x 0.7692
= 0.9269 g/cc
*: Wt fraction = (23.08/100)

Expansion ratio = gas volume/(gas volume+polymer volume)
Gas volume/polymer volume=expansion ratio/(1-expansion ratio)

Foam Density in g/cc = weight of polymer and gas/volume of polymer and gas
= weight of polymer/volume of polymer and gas
= density of polymer/(1+volume of gas/volume of polymer)
=density of polymer/(1+expansion ratio/(1-expansion ratio))
= density of polymer x (1-expansion ratio)
= 0.9269 (1 – (63/100)) = 0.3429 g/cc

Foam Density in Kg/m^3 = density in g/cc * conversion factor (1000)
= 0.3429 * 1000 = 343

The lowest foam density achieved by Sakamoto using chemical blowing agent (CBA) is 340 kg/m^3. CBAs need a high processing profile for decomposition, which prevents it from making very low density foam. Our invention discloses densities much below the above mentioned range.
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